

# Book Reviews

## James Clerk Maxwell: a biography

Ivan Tolstoy

Canongate, 1981, 184pp. £9.95\*

This new biography is a delight to read. It is an account both of Maxwell's life and of his scientific achievements, and although there are few surprises for knowledgeable readers, Prof. Tolstoy writes so clearly and intelligently that the book is difficult to put down.

The organisation of the biography is basically chronological, after a brief overview at the beginning. The author follows his subject from early childhood on the Clerk Maxwell estate, Glenair, in Scotland, on to the Edinburgh Academy, and then as student at Edinburgh University and Cambridge University, where Maxwell achieved the rank of second wrangler in the mathematics tripos. Maxwell's professional career kept him at universities for the rest of his life — at Aberdeen, King's College in London and Cambridge — apart from a six-year respite at mid-career at Glenair. In Aberdeen he acquired a wife, Katherine Mary Dewar, the daughter of the principal of Marischal College, where Maxwell was employed.

The account of Maxwell's scientific achievements is interwoven in the book with biographical detail. Inclusion of both has made the biographer's task more difficult, and it is to Prof. Tolstoy's credit that the text flows smoothly from one subject to the other. The description of Maxwell's work increases the reader's interest, for Maxwell's life was in fact rather uneventful, and is memorable primarily by virtue of his genius, as revealed in his scientific contributions.

Maxwell's research included topics in geometry, in which his first paper was published at the age of 14, in elasticity, in colour and optics, in mechanics, in electricity and magnetism (and electromagnetic theory), in thermodynamics, in statistical mechanics (a field which he helped to found) and in other areas. As an aside, almost, he turned out a paper on the theory of governors, which was good enough to inspire Norbert Wiener to create the name 'cybernetics' in Maxwell's honour. His crowning achievement was electromagnetic-field theory, as summarised in the famous equations bearing his name. The equations include light as a special case, and their creation opened the door for radio communication.

The chapter entitled 'Electromagnetism, light and Maxwell' is in some ways the most successful in the book. Without recourse to mathematics, but at the same time without shying from difficult concepts, Prof. Tolstoy succeeds in characterising accurately Maxwell's important position in the history of science and in conveying to the reader the revolutionary nature of Maxwell's contributions. Maxwell's work pointed not only on a fairly direct path to Einstein's special theory of relativity, it also completely transformed the way that physicists conceived of the physical world.

As a writer, Prof. Tolstoy tends to stay in the background, giving expression to his personal point of view primarily through his selection of material. He is clearly sympathetic to Maxwell, however, and at one point falls into the trap of trying to inflate his subject's importance. How else can one explain the almost meaningless claim on p.148 that Maxwell's 'Treatise on electricity and magnetism' is, next to Newton's 'Principia', 'the most famous book in the history of physics'?

For some reason, Prof. Tolstoy reverses the order of the sequence of events in Sir Horace Lamb's famous anecdote concerning Maxwell's inaugural lecture as professor of experimental physics at Cambridge. Sir Horace put the sparsely publicised, official inaugural before the initial lecture to undergraduates, which the 'big names' at Cambridge duly attended, whereas Prof. Tolstoy arranges the events in the opposite order. Although Prof. Tolstoy may have had good reason for changing the chronology, his source of information is not acknowledged.

All modern biographies of Maxwell rely heavily for personal characterisation on Lewis Campbell's classic biography of 1882. Campbell was a priest and classical scholar who had strong views on what was fit for print. Prof. Tolstoy, like other biographers, tries to give a more balanced picture of Maxwell's character, and succeeds in doing so to the extent that additional information is available to him. But Campbell had the advantage of knowing Maxwell personally, for the two had been lifelong friends. His biography excels in describing Maxwell; Prof. Tolstoy's in explaining him.

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\*The publishers are offering this book to IEE members at a special price of £7.95 post free until the 31st March 1982. Send cheque or postal order to Canongate Publishing, 17 Jeffrey Street, Edinburgh, Scotland, and mark 'IEE offer' on the envelope.